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मानक

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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 3640 (1982): Hexagon Fit Bolts [PGD 31: Bolts, Nuts and Fasteners Accessories]



“ज्ञान से एक नये भारत का निर्माण”

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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*  
**SPECIFICATION FOR  
 HEXAGON FIT BOLTS**  
*( First Revision )*

REAFFIRMED

2001

**1. Scope** — Covers the requirements for hexagon fit bolts in the diameter range 8 to 52 mm.  
**2. Dimensions and Tolerances** — The dimensions and tolerances for hexagon fit bolts shall be as given in Table 1.

**2.1** The preferred length-size combinations and shank lengths are given in Table 2.

**2.2** Dimensions for application of hexagon fit bolts are given in Table 3.

**3. Grade** — The hexagon fit bolts shall be of product Grade B as specified in IS : 1367 ( Part 2 ) - 1979 ' Technical supply conditions for threaded steel fasteners, Part 2 Product grades and tolerances ( second revision ) '.

**4. Mechanical Properties** — Hexagon fit bolt shall conform to property clause 5.6 of IS : 1367 ( Part 3 ) - 1979 ' Technical supply conditions for threaded steel fasteners, Part 3 Mechanical properties and test methods for bolts, screws and studs with full loadability ( second revision ) '.

**5. Designation** — Two different shank diameters have been specified in Table 1 to enable the purchaser to order hexagon fit bolts with shank diameters in finished or unfinished conditions. These hexagon fit bolts shall be designated as given in following clauses.

**5.1** Hexagon fit bolts shall be designated by name, nominal size, length, number of the standard and property class when shank diameter is required in the finished condition by the purchaser.

*Example:*

A hexagon fit bolt of size M20, Length 90 mm and of property class 5.6 shall be designated as :

Hexagon Fit Bolt M20 × 90 IS : 3640-5.6

**5.2** Hexagon fit bolts shall be designated by name, nominal size, shank diameter with allowance, length, number of the standard and property class when shank diameter is required to be finished by the purchaser.

*Example :*

A hexagon fit bolt of size M16, shank diameter  $d_3$  17.2 mm, length 70 mm and property class 5.6 shall be designated as :

Hexagon Fit Bolt M16 × 17.2 × 70 IS : 3640-5.6.

**6. Sampling** — Sampling and criteria of acceptance shall be in accordance with IS : 2614 - 1969 ' Method for sampling of fasteners ( first revision ) '.

**7. General Requirements**

**7.1** Centre holes are mandatory for hexagon fit bolts supplied with allowance on the shank diameter ( diameter,  $d_s$  ). For bolts supply finish to the size  $d_s$ , the provision of centre holes is left to the choice of the manufacturer.

**7.2** The limits of surface discontinuities shall be as specified in IS : 1367 ( Part 9 ) - 1979 ' Technical supply conditions for threaded steel fasteners, Part 9 Surface discontinuities on bolts, screws and studs ( second revision ) '.

**7.3** Hexagon fit bolts shall be marked and delivered as specified in IS : 1367 ( Part 18 ) - 1979 ' Technical supply conditions for threaded steel fasteners, Part 18 Marking and mode of delivery ( second revision ) '.

Adopted 29 July 1982

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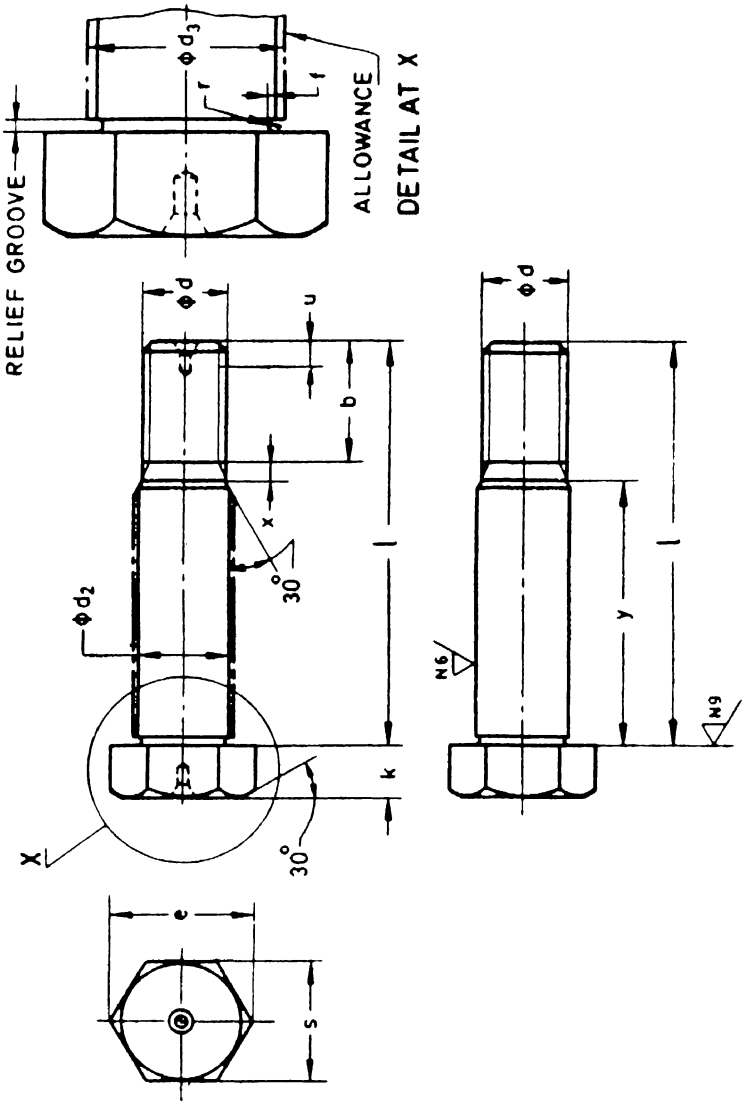
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BUREAU OF INDIAN STANDARDS  
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TABLE 1 DIMENSIONS AND TOLERANCES FOR HEXAGON FIT BOLTS

( Clause 2 )

All dimensions in millimetres.



$r$  = according to IS : 3428 - 1980 'Dimensions for relief grooves ( first revision ) '  
 $u$  = according to chamfered end ( CE ) of IS : 1368 - 1980 'Dimensions for ends of bolts and screws ( second revision ) '  
 $x$  = according to thread runout, short to IS : 1369-1982 'Dimensions of screw thread run-outs and undercuts ( second revision ) '

AMENDMENT NO. 1 JUNE 1986  
TO  
IS:3640-1982 SPECIFICATION FOR HEXAGON FIT BOLTS  
(First Revision)

(Page 4, Table 2, last entry under size M36) -  
Substitute '141' for '411'.

(EDC 27)

| Nominal<br>Size<br>$d$  | M3     | M10   | M12   | M14   | M16   | (M16) | M20   | (M22) | M24   | (M27) | M30   | (M33) | M36   | (M39) | M42   | (M45) | M48   | (M52) |
|---|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| $b + 2P$<br>0   | * 14.5 | 17.5  | 20.5  | 22    | 25    | 27.5  | 28.5  | 32.5  | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
|   | † 16.5 | 19.5  | 22.5  | 24    | 27    | 29.5  | 30.5  | 34.5  | 36.5  | 39.5  | 43    | 45    | 49    | 51    | 56    | 59    | 63    | 65    |
|   | ‡ 21.5 | 24.5  | 27.5  | 29    | 32    | 34.5  | 35.5  | 39.5  | 41.5  | 44.5  | 48    | 50    | 54    | 56    | 61    | 64    | 68    | 70    |
| $d_s$ k6 h7   | 9      | 11    | 13    | 15    | 17    | 19    | 21    | 23    | 25    | 28    | 32    | 34    | 38    | 40    | 44    | 46    | 50    | 55    |
| $d_s$ with<br>allow-<br>ance +0.2<br>0  | 9.2    | 11.2  | 13.2  | 15.2  | 17.2  | 19.2  | 21.3  | 23.3  | 25.3  | 28.3  | 32.3  | 34.3  | 38.3  | 40.3  | 44.3  | 46.3  | 50.3  | 55.4  |
| $e$ M/n   | —      | 17.60 | 19.86 | 22.78 | 26.17 | 29.56 | 32.95 | 37.29 | 39.55 | 45.20 | 50.85 | 55.37 | 60.79 | 66.44 | 71.30 | 76.95 | 82.60 | 88.25 |
| $f$ +0.15<br>0  | 0.2    | 0.2   | 0.2   | 0.2   | 0.2   | 0.2   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   |
| $k$ js 15   | 5.5    | 7     | 8     | 9     | 10    | 12    | 13    | 14    | 15    | 17    | 19    | 21    | 23    | 25    | 26    | 28    | 30    | 30    |
| $s$ $\begin{matrix} \leq 19 \text{ h14} \\ > 19 \text{ h15} \\ > 60 \text{ h16} \end{matrix}$ | 13     | 16    | 18    | 21    | 24    | 27    | 30    | 34    | 36    | 41    | 46    | 50    | 55    | 60    | 65    | 70    | 75    | 80    |

Note — Size shown in parenthesis are of second preference.

\*For lengths, up to 50 mm.

†For lengths, above 50 up to 150 mm.

‡For lengths, above 150 mm.

§Other tolerance classes shall be specified when ordering.

TABLE 2 PREFERRED LENGTH-SIZE COMBINATIONS AND SHANK LENGTHS FOR HEXAGON FIT BOLTS

All dimensions in millimetres.

| Nominal length,<br>/ is 17 | M3 | M10 | M12  | (M14) | M16   | (M18) | M20   | (M22) | M24 | (M27) | M30 | (M33) | M36 | (M39) | M42   | (M45) | M48 | (M52) |
|----------------------------|----|-----|------|-------|-------|-------|-------|-------|-----|-------|-----|-------|-----|-------|-------|-------|-----|-------|
| 25                         | 9  | —   | —    | —     | —     | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 28                         | 12 | —   | —    | —     | —     | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 30                         | 14 | —   | —    | —     | —     | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 32                         | 16 | 11  | 9.5  | —     | —     | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 35                         | 19 | 16  | 12.5 | 10.5  | —     | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 38                         | 22 | 19  | 15.5 | 13.5  | 10.5  | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 40                         | 24 | 21  | 17.5 | 15.5  | 12.5  | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 42                         | 26 | 23  | 19.5 | 17.5  | 14.5  | —     | —     | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 45                         | 29 | 26  | 22.5 | 20.5  | 17.5  | 11.5  | 13.5  | —     | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 48                         | 32 | 29  | 25.5 | 23.5  | 20.5  | 17.5  | 16.5  | 12.5  | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 50                         | 34 | 31  | 27.5 | 25.5  | 22.5  | 19.5  | 18.5  | 14.5  | —   | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 55                         | 37 | 34  | 30.5 | 28.5  | 25.5  | 22.5  | 21.5  | 17.5  | 15  | —     | —   | —     | —   | —     | —     | —     | —   | —     |
| 60                         | 42 | 39  | 35.5 | 33.5  | 30.5  | 27.5  | 26.5  | 22.5  | 20  | 17    | —   | —     | —   | —     | —     | —     | —   | —     |
| 65                         | 47 | 44  | 40.5 | 38.5  | 35.5  | 32.5  | 31.5  | 27.5  | 25  | 22    | 18  | 16    | —   | —     | —     | —     | —   | —     |
| 70                         | 52 | 49  | 45.5 | 43.5  | 40.5  | 37.5  | 36.5  | 32.5  | 30  | 27    | 23  | 21    | 16  | —     | —     | —     | —   | —     |
| 75                         | 57 | 54  | 50.5 | 48.5  | 45.5  | 42.5  | 41.5  | 37.5  | 35  | 32    | 28  | 26    | 21  | 19    | 18.5  | —     | —   | —     |
| 80                         | 62 | 59  | 55.5 | 53.5  | 50.5  | 47.5  | 46.5  | 42.5  | 40  | 37    | 33  | 31    | 26  | 24    | 23.5  | 18.5  | —   | —     |
| 85                         | —  | 64  | 60.5 | 58.5  | 55.5  | 52.5  | 51.5  | 47.5  | 45  | 42    | 38  | 36    | 31  | 29    | 28.5  | 23.5  | 19  | —     |
| 90                         | —  | 69  | 65.5 | 63.5  | 60.5  | 57.5  | 56.5  | 52.5  | 50  | 47    | 43  | 41    | 36  | 34    | 33.5  | 28.5  | 21  | 19    |
| 95                         | —  | 74  | 70.5 | 68.5  | 65.5  | 62.5  | 61.5  | 57.5  | 55  | 52    | 48  | 46    | 41  | 39    | 38.5  | 33.5  | 26  | 24    |
| 100                        | —  | 79  | 75.5 | 73.5  | 70.5  | 67.5  | 66.5  | 62.5  | 60  | 57    | 53  | 51    | 46  | 44    | 43.5  | 38.5  | 31  | 29    |
| 105                        | —  | —   | 80.5 | 78.5  | 75.5  | 72.5  | 71.5  | 67.5  | 65  | 62    | 58  | 56    | 51  | 49    | 48.5  | 43.5  | 36  | 34    |
| 110                        | —  | —   | 85.5 | 83.5  | 80.5  | 77.5  | 76.5  | 72.5  | 70  | 67    | 63  | 61    | 56  | 54    | 53.5  | 48.5  | 41  | 39    |
| 115                        | —  | —   | 90.5 | 88.5  | 85.5  | 82.5  | 81.5  | 77.5  | 75  | 72    | 68  | 66    | 61  | 59    | 58.5  | 53.5  | 46  | 44    |
| 120                        | —  | —   | 95.5 | 93.5  | 90.5  | 87.5  | 86.5  | 82.5  | 80  | 77    | 73  | 71    | 66  | 64    | 63.5  | 58.5  | 51  | 49    |
| 125                        | —  | —   | —    | —     | 95.5  | 92.5  | 91.5  | 87.5  | 85  | 82    | 78  | 76    | 71  | 69    | 68.5  | 63.5  | 56  | 54    |
| 130                        | —  | —   | —    | —     | 100.5 | 97.5  | 96.5  | 92.5  | 90  | 87    | 82  | 81    | 76  | 74    | 73.5  | 68.5  | 61  | 59    |
| 135                        | —  | —   | —    | —     | 105.5 | 102.5 | 101.5 | 97.5  | 95  | 92    | 88  | 86    | 81  | 79    | 78.5  | 73.5  | 66  | 64    |
| 140                        | —  | —   | —    | —     | 110.5 | 107.5 | 106.5 | 102.5 | 100 | 97    | 93  | 91    | 86  | 84    | 83.5  | 78.5  | 71  | 69    |
| 145                        | —  | —   | —    | —     | 115.5 | 112.5 | 111.5 | 107.5 | 105 | 102   | 98  | 96    | 91  | 89    | 88.5  | 83.5  | 76  | 74    |
| 150                        | —  | —   | —    | —     | 120.5 | 117.5 | 116.5 | 112.5 | 110 | 107   | 103 | 101   | 96  | 94    | 93.5  | 88.5  | 81  | 79    |
| 160                        | —  | —   | —    | —     | —     | —     | —     | —     | —   | 112   | 108 | 106   | 101 | 99    | 98.5  | 93.5  | 86  | 84    |
| 170                        | —  | —   | —    | —     | —     | —     | —     | —     | —   | 122   | 118 | 116   | 111 | 109   | 108.5 | 103.5 | 96  | 94    |
| 180                        | —  | —   | —    | —     | —     | —     | —     | —     | —   | 132   | 128 | 126   | 121 | 119   | 118.5 | 113.5 | 106 | 104   |
| 190                        | —  | —   | —    | —     | —     | —     | —     | —     | —   | 142   | 138 | 136   | 131 | 129   | 128.5 | 123.5 | 116 | 114   |
| 200                        | —  | —   | —    | —     | —     | —     | —     | —     | —   | 152   | 148 | 146   | 141 | 139   | 138.5 | 133.5 | 126 | 124   |

Note 1 — Preferred length-size combinations are between the stepped bold lines.

Note 2 — Sizes shown in brackets are of second preference.

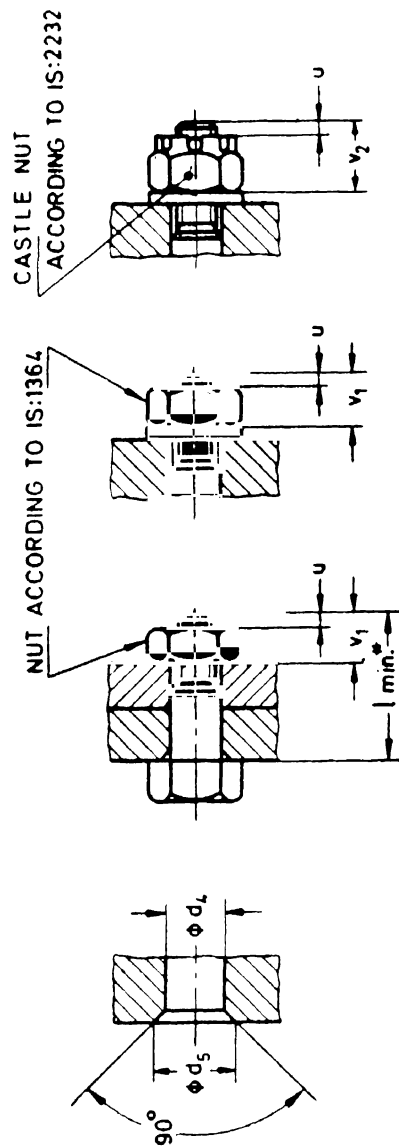
Note 3 — Lengths above 200 mm shall be selected in 10 mm steps.



TABLE 3 DIMENSIONS FOR APPLICATION OF HEXAGON FIT BOLTS

(Clause 2.2)

All dimensions in millimetres.



| Nominal Size $d$ | M8  | M10  | M12  | M14 | M16 | (M18) | M20 | (M22) | M24 | (M27) | M30 | (M33) | M36 | (M39) | M42 | (M45) | M48 | (M52) |
|------------------|-----|------|------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| $d_4$ H7         | 9   | 11   | 13   | 15  | 17  | 19    | 21  | 23    | 25  | 28    | 32  | 34    | 38  | 40    | 44  | 46    | 50  | 55    |
| $d_s$            | 10  | 12.5 | 15   | 17  | 19  | 21    | 23  | 25    | 28  | 31    | 34  | 37    | 40  | 43    | 46  | 49    | 54  | 58    |
| $u$ Min          | 2.5 | 3    | 3.5  | 4   | 4   | 5     | 5   | 5     | 6   | 6     | 7   | 7     | 8   | 8     | 9   | 9     | 10  | 10    |
| $v_1$ Min        | 9   | 11   | 13.5 | 15  | 17  | 20    | 21  | 23    | 25  | 28    | 31  | 33    | 37  | 39    | 43  | 45    | 48  | 52    |
| $v_2$ Min        | 12  | 15   | 18.5 | 20  | 23  | 26    | 26  | 31    | 33  | 36    | 40  | 42    | 46  | 48    | 55  | 57    | 60  | 76    |

Note 1 — Sizes shown in brackets are non-preferred.

\*The minimum dimension,  $l$  calculated from the clamping length shall be rounded off to the next longer bolt length.

**EXPLANATORY NOTE**

Hexagon fit bolts also known as hexagon bolts with oversize shank or bearing bolts are extensively used for couplings, plummer blocks etc.

This standard was first published in 1967. It has been observed in the use of the standard, the thread length have been too long and shank lengths short resulting in difficulty of assembly. For assisting in assembly, shank lengths have been included and application details added in the present revision.

Considerable assistance has been derived, in the preparation of this standard, from DIN 609-1971 Hexagon fit bolts with long thread portion issued by Deutsches Institut für Normung.